ESI

EnviroSystems, Inc.
P.O. Box 778
Hampton, NH 03843-0778
603-926-3345

March 12, 2013

Mr. Peter Nyberg
United Water
Hull Water Pollution Control Facility
1111 Nantasket Avenue
Hull, Massachusetts 02045

Dear Mr. Nyberg:

Enclosed, please find a copy of our report presenting the results of a toxicity test completed using an effluent sample collected from the Hull, Massachusetts Water Pollution Control Facility during the February 2013 sampling period. Acute toxicity was evaluated using the inland silverside, *Menidia beryllina*.

Please do not hesitate to call me, Kirk Cram or Petra Karbe should you have any questions regarding the report.

Sincerely,

EnviroSystems, Incorporated

Kenneth A. Simon
President

Enclosure
WET Test Report Certification
Report Number 23035-13-02
One (1) copy + email

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION

Permittee Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: _____

_____

Authorized Signature

_____

Print or Type Name

Hull Permanent Sewer Commission

Print or Type the Permittee's Name

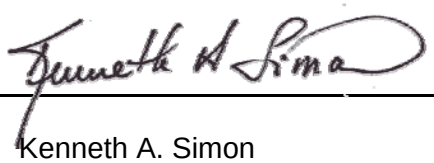
MA0101231

Type or Print the NPDES Permit No.

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Bioassay Laboratory)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: March 12, 2013



Kenneth A. Simon
President - EnviroSystems, Inc.

TOXICOLOGICAL EVALUATION
OF A TREATED MUNICIPAL EFFLUENT
BIOMONITORING SUPPORT FOR A NPDES PERMIT:
February 2013

Hull Water Pollution Control Facility
Hull, Massachusetts
NPDES Permit Number MA0101231

Prepared For:

United Water
Hull Water Pollution Control Facility
1111 Nantasket Avenue
Hull, Massachusetts 02045

Prepared By:

EnviroSystems, Incorporated
One Lafayette Road
Hampton, New Hampshire 03842

February 2013
Reference Number Hull 23035-13-02

STUDY NUMBER 23035

EXECUTIVE SUMMARY

The following summarizes the results of an acute exposure bioassay completed during February 2013 in support of the NPDES biomonitoring requirements of the Hull, Massachusetts Water Pollution Control Facility, operated by United Water. The 48 hour acute definitive assay was completed using the inland silverside, *Menidia beryllina*.

M. beryllina were 9 days old at the start of the test. Dilution water was receiving water collected from Massachusetts Bay at a point away from the discharge.

Samples were received under chain of custody in good order. All sample receipt, test conditions and control endpoints were within protocol specifications except where otherwise noted. The results presented in this report relate only to the samples described on the chain(s) of custody and sample receipt log(s), and are intended to be used only by the submittor.

Results from the acute exposure assay and their relationship to permit limits are summarized in the following matrix.

Acute Toxicity Evaluation

Species	Exposure	LC-50	A-NOEC	Permit Limit (LC-50)	Effluent Meets Permit Limit	Assay Meets Protocol Limits
Menidia beryllina	48 Hours	>100%	100%	≥100%	Yes	Yes

.

TOXICOLOGICAL EVALUATION
OF A TREATED MUNICIPAL EFFLUENT
BIOMONITORING SUPPORT FOR A NPDES PERMIT:
February 2013

Hull Water Pollution Control Facility
Hull, Massachusetts
NPDES Permit Number MA0101231

1.0 INTRODUCTION

This report presents the results of an acute toxicity test completed on a composite effluent sample collected from the Hull, Massachusetts Water Pollution Control Facility (Hull WPCF), operated by United Water. Testing was based on programs and protocols developed by the US EPA (2002) with exceptions as noted by US EPA Region I (US EPA Region 1, 2012) and involved conducting a 48 hour static acute toxicity test with the inland silverside, *Menidia beryllina*. Testing was performed at EnviroSystems, Incorporated (ESI), Hampton, New Hampshire in accordance with the provisions of the NELAC Standards (2003).

Acute toxicity tests involve preparing a series of concentrations by diluting effluent with control water. Groups of test animals are exposed to each effluent concentration and a control for a specified period. In acute tests, mortality data for each concentration are used to calculate (by regression) the median lethal concentration, or LC-50, defined as the effluent concentration which kills half of the test animals. Samples with high LC-50 values are less likely to cause significant environmental impacts. The no-effect concentration is also determined to provide information about the level of effluent which would have minimal acute effects in the environment. This Acute No Observed Effect Concentration (A-NOEC) is defined as the highest tested effluent concentration which causes no significant mortality.

2.0 MATERIALS AND METHODS

2.1 General Methods

Toxicological and analytical protocols used in this program follow procedures primarily designed by the EPA to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms, and for the analysis of water samples. See Section 4.0 for a list of references.

2.2 Test Species

When necessary, *M. beryllina* were acclimated to approximate test conditions prior to use in the assay. Test organisms were transferred to test chambers using a large bore glass pipet, minimizing the amount of water added to test solutions. Twenty control fish were weighed during the test to confirm loading rates. The loading rate was below the maximum 0.4 g/L loading rate recommended for assays conducted at 25°C. Fish weights and loading calculations are included in the data appendix.

2.3 Effluent, Receiving Water and Laboratory Water

Effluent and receiving water collection information is provided in Table 1. Samples were stored at 4°C and warmed to 25±1°C prior to preparing test solutions. Effluent used in the *M. beryllina* assay was salinity adjusted to 25±2 ppt using artificial sea salts according to protocol (EPA 2002). Laboratory water was collected from the Hampton/Seabrook Estuary. This water is classified as SA-1 and has been used to culture marine test organisms since 1981.

Total residual chlorine (TRC) was measured by amperometric titration (MDL 0.02 mg/L) in both the effluent and diluent samples. If chlorine was present, the sample was dechlorinated using sodium thiosulfate and a control assay using laboratory water treated with an equal amount of sodium thiosulfate was run concurrently. Data for the sodium thiosulfate laboratory control can be found in Appendix A.

2.4 Acute Toxicity Test

The 48 hour static acute toxicity test was conducted at 25±1°C with a photoperiod of 16:8 hours light:dark. Test chambers were 250 mL glass beakers containing 200 mL test solution in each of 4 replicates with 10 organisms/replicate. Test concentrations for the assay were 100%, 50%, 25%, 12.5%, and 6.25% effluent. Survival and dissolved oxygen were recorded daily in all replicates. Specific conductivity, salinity, temperature, and pH were measured daily in one replicate of each test treatment.

2.5 Data Analysis

When applicable, statistical analysis of acute exposure data was completed using CETIS, Comprehensive Environmental Toxicity Testing System, software. The program computes acute exposure endpoints based on EPA decision tree guidelines specified in individual test methods. If survival in the highest test concentration is >50%, the LC-50 is obtained by direct observation of the raw data.

2.6 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are completed on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. See Table 2 for details.

3.0 RESULTS AND DISCUSSION

Results of the acute exposure bioassay completed using the inland silverside are summarized in Table 3. Effluent and dilution water characteristics are presented in Table 4. US EPA Region I toxicity test summary sheet can be found after the tables. Support data, including copies of the laboratory bench sheets, are included in Appendix A.

Minimum test acceptability criteria require ≥90% survival in the control concentrations. Achievement of these results indicate that healthy test organisms were used and that the dilution water had no significant adverse impact on the outcome of the assay. See the Executive Summary and Table 3 for test acceptability.

4.0 LITERATURE CITED

APHA. 2012. *Standard Methods for the Examination of Water and Wastewater*, 22nd Edition. Washington D.C.

National Environmental Laboratory Accreditation Conference: Quality Systems. Chapter 5. June 2003.

US EPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fifth Edition. EPA-821-R-02-012.

US EPA Region I. 2012. *Marine Acute Toxicity Test Procedure and Protocol*. US EPA Region I Office, Boston, Massachusetts. July 2012.

TABLE 1. Summary of Sample Collection Information.
Hull WPCF Effluent Biomonitoring Program. February 2013.

Sample Description	Type	Collection Date	Collection Time	Receipt Date	Receipt Time	Arrival Temp °C
Effluent	Comp	02/12-13/13	0800-0800	02/13/13	0830	3
Receiving Water	Grab	02/13/13	0800	02/13/13	0830	3

TABLE 2. Summary of Reference Toxicant Data.
Hull WPCF Effluent Biomonitoring Program. February 2013.

Date		Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
M. beryllina						
01/23/13	Survival	LC-50 - 48 Hr	8.0	7.9	6.1 - 9.7	02/13/13

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays

TABLE 3. Summary of Acute Evaluation Results.
Hull WPCF Effluent Biomonitoring Program. February 2013.

		Percent Survival						
Species	Exposure	Lab	RW	6.25%	12.5%	25%	50%	100%
M. beryllina	48 hours	95%	92.5%	87.5%	97.5%	100%	97.5%	92.5%

LC-50 and A-NOEC Results

Species	Exposure	Spearman-Karber	Probit	A-NOEC
M. beryllina	48 Hours	NC	NC	100%

COMMENTS:
RW - Receiving Water; used as diluent for assay
NC - The LC-50 value could not be computed by this method for this data set.

TABLE 4. Summary of Effluent and Diluent Characteristics.
Hull WPCF Effluent Biomonitoring Program. February 2013.

PARAMETER	UNIT	EFFLUENT	RECEIVING WATER
Specific Conductivity - As Received	µmhos/cm	18110	48970
Specific Conductivity - Salinity Adjusted	µmhos/cm	38980	38930
pH - As Received	SU	7.08	7.57
pH - Salinity Adjusted	SU	7.58	7.73
Salinity - As Received	ppt	11	32
Salinity - Salinity Adjusted	ppt	25	25
Total Residual Chlorine	mg/L	0.064*	<0.02
Total Solids	mg/L	12000	35000
Total Suspended Solids	mg/L	35	25
Ammonia as N	mg/L	8.8	<0.1
Total Organic Carbon	mg/L	3.3	<0.4
Aluminum, total	mg/L	0.097	0.18
Cadmium, total	mg/L	<0.0005	<0.0007
Chromium, total	mg/L	<0.002	<0.002
Copper, total	mg/L	0.034	0.005
Lead, total	mg/L	0.002	0.0007
Nickel, total	mg/L	0.002	<0.002
Zinc, total	mg/L	0.069	0.006

COMMENTS:
* Effluent was received with 0.064 mg/L residual chlorine. After salinity adjustment, the residual chlorine was found to be <0.02mg/L, therefore, no adjustment with sodium thiosulfate was necessary.

Additional water quality and analytical support chemistry data are available in Appendix A.

TOXICITY TEST SUMMARY SHEET

FACILITY NAME: Hull WPCF
NPDES PERMIT NO.: MA0101231
TEST START DATE: 0214/13
TEST END DATE: 02/16/13

TEST TYPE	TEST SPECIES	SAMPLE TYPE	SAMPLE METHOD
X Acute	___ *Pimephales promelas*	___ Prechlorinated	___ Grab
___ Chronic	___ *Ceriodaphnia dubia*	___ Dechlorinated	X Composite
___ Modified Chronic (Reporting Acute Values)	___ *Daphnia pulex*	___ Chlorine Spiked in Lab	___ Flow-thru
	___ *Americamysis bahia*	X Chlorinated on Site	___ Other
___ 24 Hour Screen	___ *Cyprinodon variegatus*	___ Unchlorinated	
	X *Menidia beryllina*	___ No Detectable Chlorine Upon Receipt	
	___ *Arbacia punctulata*	___ Dechlorinated at lab	
	___ *Champia parvula*		
	___ *Selenastrum capricornutum*		

DILUTION WATER:

X Receiving water collected at a point upstream or away from the discharge, free from toxicity or other sources of contamination; Receiving Water Name: Massachusetts Bay

___ Alternate surface water of known quality and hardness, to generally reflect the characteristics of the receiving water; Receiving Water Name: _____

___ Synthetic water prepared using either Millipore Milli-Q or equivalent deionized water and reagent grade chemicals; or deionized water combined with mineral water.

___ Artificial sea salts mixed with deionized water

___ Deionized water and hypersaline brine

___ Other

EFFLUENT SAMPLING DATES: 02/12-13/13 _____ _____ _____

EFFLUENT CONCENTRATIONS TESTED (%): 6.25; 12.5; 25.0; 50.0; 100

Permit Limit Concentration: ≥100 %

Was the effluent salinity adjusted? Yes If yes, to what level? 25 ppt

REFERENCE TOXICANT TEST DATE: 01/23/13 LC-50: 8.0 mg/L Sodium Dodecyl Sulfate

PERMIT LIMITS AND TEST RESULTS

Test Acceptability Criteria

Mean Control Survival: 92.5%

LIMITS		**RESULTS**	
LC-50:	≥100 %	LC-50	>100 %
		Upper Limit:	- %
A-NOEC:	- %	Lower Limit:	- %
		Method:	Direct Observation
C-NOEC:	- %	A-NOEC:	100 %
		C-NOEC:	- %
		LOEC:	-
IC- ___	- %	IC- ___	- %

APPENDIX A

DATA SHEETS

STATISTICAL SUPPORT

METHODS USED IN NPDES PERMIT BIOMONITORING TESTING

Parameter	Method
Acute Exposure Bioassays:	
Ceriodaphnia dubia	EPA-821-R-02-012 2002.0
Daphnia pulex	EPA-821-R-02-012 2021.0
Pimephales promelas	EPA-821-R-02-012 2000.0
Americamysis bahia	EPA-821-R-02-012 2007.0
Menidia beryllina	EPA-821-R-02-012 2006.0
Cyprinodon variegatus	EPA-821-R-02-012 2004.0
Chronic Exposure Bioassays:	
Ceriodaphnia dubia	EPA-821-R-02-013 1002.0
Pimephales promelas	EPA-821-R-02-013 1000.0
Cyprinodon variegatus	EPA-821-R-02-014 1004.0
Menidia beryllina	EPA-821-R-02-014 1006.0
Arbacia punctulata	EPA-821-R-02-014 1008.0
Champia parvula	EPA-821-R-02-014 1009.0
Trace Metals:	
Trace Metals	EPA 200.8/SW 6020, EPA 245.7
Hardness	Standard Methods 22nd Edition - Method 2340 B
Wet Chemistries:	
Alkalinity	EPA 310.2
Chlorine, Residual	Standard Methods 22nd Edition - Method 4500-Cl D
Total Organic Carbon	Standard Methods 22nd Edition - Method 5310 C
Specific Conductance	Standard Methods 22nd Edition - Method 2510 B
Nitrogen - Ammonia	Standard Methods 22nd Edition - Method 4500-NH_3 G
pH	Standard Methods 22nd Edition - Method 4500-H+ B
Solids, Total (TS)	Standard Methods 22nd Edition - Method 2540 B
Solids, Total Dissolved (TDS)	Standard Methods 22nd Edition - Method 2540 C
Solids, Total Suspended (TSS)	Standard Methods 22nd Edition - Method 2540 D
Dissolved Oxygen	Standard Methods 22nd Edition - Method 4500-O G

Please visit our web site at www.envirosystems.com for a copy of our DoD ELAP Accreditation, NH NELAP Accreditation and Massachusetts State Certification.

ACUTE BIOASSAY DATA SUMMARY

STUDY: 23035
CLIENT: United Water
SAMPLE: Hull WWTF Effluent
DILUENT: Receiving Water

Brine Shrimp: A- 3090
TEST ORGANISM: *M. beryllina*
ORGANISM SUPPLIER / BATCH / AGE: *See Organism Culture Sheet*

"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES

	T. Metals	TOC	AMM	TS/TSS	pH	S/C	SALINITY	TRC
EFF	002	003	004	005	7.08	18110	10.7	0.04/<0.02
DIL	007	008	009	010	7.57	48970	32.0	<0.02

SALINITY ADJUSTMENT RECORD : 3500 ML EFFLUENT + 58 G SEA SALTS (A- 3146) = 100% ACTUAL PERCENTAGE
1500 mL RW + 2500 mL DI H2O = 75% Actual Percentage

CONC	REP	SURVIVAL 0	24	48	DO (mg/L) 0	24	48	pH (SU) 0	24	48	TEMP (°C) 0	24	48	S/C (µmhos/cm) 0	24	48	SALINITY (ppt) 0	24	48
LAB	A	10	10	10	8.5	4.4	5.7	7.76	7.40	7.64	24	24	24	38360	38430	37550	24	25	25
	B	10	9	9	8.5	4.3	5.7								UB 40110	39300			
	C	10	9	9	8.5	4.2	5.8												
	D	10	10	10	8.5	4.2	5.6												
RW	A	10	10	9	8.9	4.7	5.5	7.73	7.38	7.42	25	24	24	38930	40320	41460	25	26	27
	B	10	10	8	8.9	4.7	4.8												
	C	10	10	10	8.9	4.4	4.8												
	D	10	10	10	8.9	4.3	4.7												
6.25%	A	10	10	10	9.5	4.2	4.7	7.73	7.37	7.53	25	24	24	39000	40090	41090	25	26	26
	B	10	9	9	9.5	4.5	4.7												
	C	10	9	7	9.5	4.7	5.1												
	D	10	10	9	9.5	4.6	4.5												
12.5%	A	10	10	10	9.5	4.1	4.8	7.73	7.42	7.57	25	24	24	39080	40110	41070	25	26	26
	B	10	10	10	9.5	4.3	4.9												
	C	10	10	10	9.5	4.3	4.6												
	D	10	9	9	9.5	4.3	5.3												
DATE		2/14/13	2/15/13	2/16	02/14/13	2/15/13	2/16												
TIME		1350	(B) (JM) 1240	1330	1320	1240	1305												
INITIALS		ND	JM	UB	SG	JM	UB												

ACUTE BIOASSAY DATA SUMMARY

STUDY: 23035	Brine Shrimp: A- 3090	
CLIENT: United Water	TEST ORGANISM: *M. beryllina*	
SAMPLE: Hull WWTF Effluent	ORGANISM SUPPLIER / BATCH / AGE: *See Organism Culture Sheet*	
DILUENT: Receiving Water		

CONC	REP	SURVIVAL 0	SURVIVAL 24	SURVIVAL 48	DO (mg/L) 0	DO (mg/L) 24	DO (mg/L) 48	pH (SU) 0	pH (SU) 24	pH (SU) 48	TEMP (°C) 0	TEMP (°C) 24	TEMP (°C) 48	S/C (µmhos/cm) 0	S/C (µmhos/cm) 24	S/C (µmhos/cm) 48	SALINITY (ppt) 0	SALINITY (ppt) 24	SALINITY (ppt) 48
25%	A	10	10	10	9.4	4.7	4.8	7.71	7.43	7.58	25	24	24	39070	40180	~~41090~~	25	26	26
	B	10	10	10	9.4	4.6	4.8									41180			
	C	10	10	10	9.4	4.6	4.7												
	D	10	10	10	9.4	4.4	4.5												
50%	A	10	10	10	9.4	4.2	4.6	7.67	7.47	7.62	25	24	24	38990	40270	41350	25	26	26
	B	10	9	9	9.4	4.0	4.7												
	C	10	10	10	9.4	4.1	4.6												
	D	10	10	10	9.4	4.1	4.6												
100%	A	10	10	10	9.3	4.2	4.8	7.58	7.60	7.67	25	24	24	38980	40580	41880	25	26	27
	B	10	10	10	9.3	4.3	4.5												
	C	10	10	9	9.3	4.3	4.4												
	D	10	10	8	9.3	4.2	4.2												
DATE		2/14/13	2/15/13	2/16	02/14/13	2/15	2/16												
TIME		1350	1240	1330	1320	1240	1305												
INITIALS		ND	JM	LB	SG	JM	LB												

Organism Wet Weights

Study: 23035

Client: Hull

Date/Time/Intials: 02/14/13 1551 DM

Start/End?:

Instrument Used: Fisher Accu - 225D 17008376

Rep		Duplicate*
1	0.01067	
2	0.00864	
3	0.01968	
4	0.00811	
5	0.00648	0.00647
6	0.01851	
7	0.00851	
8	0.00864	
9	0.00768	
10	0.00672	0.00669
11	0.00449	
12	0.00661	
13	0.00653	
14	0.00497	
15	0.00398	0.00394
16	0.00764	
17	0.00422	
18	0.00292	
19	0.00397	
20	0.00359	0.00359

Mean Weight (g):	0.007628
Test Volume (L):	0.2
Loading Rate(g/L)	0.3814

Aquatic Research Organisms

DATA SHEET

rec. 2/14/13.

I. Organism History

Species MENIDIA BERYLLINA

Source: Lab reared ✓ Hatchery reared _____ Field collected _____

Hatch date 2-5-13 Receipt date _____

Lot number 020213MB Strain _____

Brood origination CAPE COD MA

II. Water Quality

Temperature 25 °C Salinity ~28 ppt D.O. — ppm

pH 7.8 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating ✓ Flow through _____ Static renewal _____

DIET: Flake food ✓ Phytoplankton _____ Trout chow _____

Artemia ✓ Rotifers ✓ YCT _____ Other ENCAP. SHRIMP DIET

Prophylactic treatments: _____

Comments: _____

_____

IV. Shipping Information

Client: EST # of Organisms 640+

Carrier: _____ Date shipped 2-14-13

Biologist: Mark Mayo

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

RECORD OF METERS USED

STUDY: 23035	CLIENT: United Water - Hull, MA WWTF	
Exposure (Hours)		
	0	24	48
Water Quality Station #	2	2	2
Initials / Date	SG 02/14/13	JM 2/15/13	UB 2/16

Water Quality Station #1		Water Quality Station #2		COMMENTS
DO meter #		DO meter #	23	
DO probe #		DO probe #	89	
pH meter #		pH meter #	470	
pH probe #		pH probe #	110	
S/C meter #		S/C meter #	YSI30E	
S/C probe #		S/C probe #	↓	
Salinity meter #		Salinity meter #		

PREPARATION OF DILUTIONS

Diluent: Receiving Water (RW)	Day: 0 Sample: E0, D0	
Concentration %	Vol. Eff.(mls)	Final Vol.(mls)
Lab	0	800
RW	0	↓
6.25%	50	↓
12.5%	100	↓
25%	200	↓
50%	400	↓
100%	800	
INITIALS:	SG	
TIME:	1225	
DATE:	02/14/13	

Report No: 23035 SDG:
Project: Hull

Sample ID: Effluent Start
Matrix: Water
Sampled: 02/13/13 0800

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	23035-005	12000	50	mg/L	02/18/13 1420	02/21/13 1115	JTP/SM2540B
Total suspended solids	23035-005	35	2.5	mg/L	02/19/13 1410	02/21/13 0830	JTP/SM 2540D
Total organic carbon	23035-003	3.3	0.4	mg/L	02/20/13	02/20/13	BC /SM 5310 C
Ammonia-N	23035-004	8.8	0.1	mg/L as N	02/14/13 1358	02/14/13 1358	JLH/SM 4500-NH3 G
Aluminum, total	23035-002	0.097	0.02	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Cadmium, total	23035-002	ND	0.0005	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Calcium, total	23035-002	160	0.06	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Chromium, total	23035-002	ND	0.002	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Copper, total	23035-002	0.034	0.002	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Lead, total	23035-002	0.002	0.0005	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Magnesium, total	23035-002	350	0.05	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Nickel, total	23035-002	0.002	0.002	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Zinc, total	23035-002	0.069	0.002	mg/L	03/07/13	03/10/13	JLH/EPA 200.8

Sample ID: Receiving Water Start
Matrix: Water
Sampled: 02/13/13 0800

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	23035-010	35000	100	mg/L	02/18/13 1420	02/21/13 1115	JTP/SM2540B
Total suspended solids	23035-010	25	2.5	mg/L	02/19/13 1410	02/21/13 0830	JTP/SM 2540D
Total organic carbon	23035-008	ND	0.4	mg/L	02/20/13	02/20/13	BC /SM 5310 C
Ammonia-N	23035-009	ND	0.1	mg/L as N	02/14/13 1402	02/14/13 1402	JLH/SM 4500-NH3 G
Aluminum, total	23035-007	0.18	0.02	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Cadmium, total	23035-007	ND	0.0007	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Calcium, total	23035-007	390	0.2	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Chromium, total	23035-007	ND	0.002	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Copper, total	23035-007	0.005	0.002	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Lead, total	23035-007	0.0007	0.0005	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Magnesium, total	23035-007	1100	0.05	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Nickel, total	23035-007	ND	0.002	mg/L	03/07/13	03/10/13	JLH/EPA 200.8
Zinc, total	23035-007	0.006	0.002	mg/L	03/07/13	03/10/13	JLH/EPA 200.8

Notes:

ND = Not Detected

ESI

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	23035		
SDG No:	Hull		
Project:	Hull		
Delivered via:	ESI		
Date and Time Received:	02/13/13 0830	Date and TIme Logged into Lab:	02/13/13 1445
Recieved By:	KAS	Logged into Lab by:	CS CS
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	3	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	A1000046		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required		

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Effluent Start	23035-001	W	MB48AD StartSample	1x3750 P	4 C	Yes
Effluent Start	23035-002	W	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;	250 P	HNO3	Yes
Effluent Start	23035-003	W	TOC	1x40 G	H2SO4	Yes
Effluent Start	23035-004	W	NH3;	125 P	H2SO4	Yes
Effluent Start	23035-005	W	TS,TSS	500 P	4 C	Yes
Receiving Water Start	23035-006	W	MB48AD StartDiluent	2x3750 P	4 C	Yes
Receiving Water Start	23035-007	W	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;	250 P	HNO3	Yes
Receiving Water Start	23035-008	W	TOC	1x40 G	H2SO4	Yes
Receiving Water Start	23035-009	W	NH3;	125 P	H2SO4	Yes
Receiving Water Start	23035-010	W	TS,TSS	500 P	4 C	Yes

Notes and qualifications:

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 23035

CHAIN OF CUSTODY DOCUMENTATION

Client: United Water - Hull	Contact: Peter Nyberg	Project Name: United Water - Hull WWTF	
Report to: Peter Nyberg	Address: 1111 Nantasket Avenue	Project Number: P0036	Task: 0001
Invoice to: Peter Nyberg	Address: Hull, MA 02045	Project Manager: Peter Nyberg	
Voice: 781-925-0906	Fax: 781-925-3056	email: peter.nyberg@unitedwater.com	P.O.No: ' Quote No:41181

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
001	Effluent Start	2/12/13/13	8AM/8AM	ES	C	1	3750	P	4 C	Water	N	MB48AD StartSample
002	Effluent Start	2/12/13/13	8AM/8AM	ES	C	1	250	P	HNO3	Water	N	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;
003	Effluent Start	2/12/13/13	8AM/8AM	ES	C	1	40	G	H2SO4	Water	N	TOC
004	Effluent Start	2/12/13/13	8/AM/8AM	ES	C	1	125	P	H2SO4	Water	N	NH3;
005	Effluent Start	2/12/13/13	8AM/8AM	ES	C	1	500	P	4 C	Water	N	TS,TSS
006	Receiving Water Start	2/13/13	8AM	ES	G	2	3750	P	4 C	Water	N	MB48AD StartDiluent
007	Receiving Water Start	2/13/13	8AM	ES	G	1	250	P	HNO3	Water	N	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;
008	Receiving Water Start	2/13/13	8AM	ES	G	1	40	G	H2SO4	Water	N	TOC
009	Receiving Water Start	2/13/13	8AM	ES	G	1	125	P	H2SO4	Water	N	NH3;
010	Receiving Water Start	2/13/13	8AM	ES	G	1	500	P	4 C	Water	N	TS,TSS

Relinquished By: Eric Sutton	Date: 2/13/13 Time: 8:30AM	Received By: Ken Simas	Date: 2/13/13 Time: 0830
Relinquished By:	Date: 2/13/13 Time: 8:30 AM	Received at Lab By:	Date: Time:

Comments:

ERR

COC Number: A1000046

Sample Delivery Group No: Feb 2013	Page of